

SAMPLE 1



LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

ADVANCED LIGO FTIR SAMPLE RECORD

Document:	LIGO-E	1900306	-v1	Date:	Sept 27th 2019		
Submitter:	Name:	CALUM TORRLE		Email address:	CIT@CALTECH.EDU	Location:	CIT.
Title:	FTIR: NOZZLE BAFFLES (BLACK NICKEL COATED STAINLESS STEEL)						
System(s):	SLIC						
Assembly(ies):	D1800227 (x4) SAMPLE 1.						
Bake Load:	BAKE - 9533		<input checked="" type="checkbox"/>	Pre-Bake	<input checked="" type="checkbox"/>	Class A	<input type="checkbox"/> URGENT?
JIRA URL:			<input type="checkbox"/>	Post Bake	<input type="checkbox"/>	Class B	
Notes:	SURFACES ONLY. SAMPLE 1 USED ON ALL 4 PARTS (2 PASSES) TOTAL AREA SAMPLED 40 in ² . (AIR BAKE (A800g))						

PARTS				SAMPLES			
#	Part No.	SN	Description	#	Type	Description (for holes indicate "through" or "blind")	Amount
1	D1800227	002	NOZZLE BAFFLE BLACK NICKEL COATED STL	1	Surface	4" x 2.5" AREA (2 PASSES)	Area (cm ²): 10 in ²
				2	Holes		# of Holes:
2	D1800227	003	" "	3	Surface	4" x 2.5" AREA (2 PASSES)	Area (cm ²): 10 in ²
				4	Holes		# of Holes:
3	D1800227	005	" "	5	Surface	4" x 2.5" AREA (2 PASSES)	Area (cm ²): 10 in ²
				6	Holes		# of Holes:
4	D1800227	006	" "	7	Surface	4" x 2.5" AREA (2 PASSES)	Area (cm ²): 10 in ²
				8	Holes		# of Holes:
5				9	Surface	SAMPLE 1 TOTAL	Area (cm ²): 40 in ²
				10	Holes		# of Holes:

ADVANCED LIGO FTIR SAMPLE RECORD

6				11	Surface	Area (cm ²):
				12	Holes	# of Holes:
7				13	Surface	Area (cm ²):
				14	Holes	# of Holes:
8				15	Surface	Area (cm ²):
				16	Holes	# of Holes:
9				17	Surface	Area (cm ²):
				18	Holes	# of Holes:
10				19	Surface	Area (cm ²):
				20	Holes	# of Holes:

Instructions:

- 1) All parts must be sampled. The sampling must be at least 5% of the total area and at least 5% of the total number of holes. Surface samples and hole samples are to be separate. Sampling fewer than all parts in a bake load, or sampling less than 5% of the area or holes requires a waiver from the Vacuum Review Board, or a LIGO Vacuum Review Team member (see the Advanced LIGO [VRB wiki](#) for member list). (*Sampling requirements are defined in section 5.1 of E0900480.*)
- 2) Read the instructions on how to take FTIR samples, given in document LIGO-E0900479. Make sure that the sample bottles are tightly sealed!
- 3) Reserve a Document Number (E-type) from the LIGO Document Control Center (DCC):
<https://dcc.ligo.org/cgi-bin/private/DocDB/ReserveHome>
- 4) Complete the form above.
- 5) File this completed form in the DCC under the reserved number as revision 1, i.e. -v1.
- 6) If off-site ship a printed copy of this completed form and the FTIR Samples (properly packaged) to Calum Torrie at Caltech. Follow ALL procedures laid out in LIGO-T1700469: Documentation associated with shipping "dangerous goods" in excepted quantities.
- 7) Once at Caltech Calum will review (for need and priority) and then forward a printed copy of this completed form and the FTIR Samples (properly packaged) to:
Attn: Jerami Mennella, Jet Propulsion Laboratory
Bldg 83 room 1014800 Oak Grove drive Pasadena, California 91109-8099
- 8) Calum will then send an email to Jerami.Mennella@jpl.nasa.gov indicating that an FTIR sample package is in route and indicate whether testing results are urgent or not.
- 9) JPL should put the LIGO document number of this sample form into the header of their FTIR analysis report and email this report to the submitter (email given in form).
- 10) The completed FTIR analysis report from JPL is to be reviewed and approved by the Vacuum Review Team member at the submitter's location. The Vacuum Review Team member makes any desired notations on the report and then files the report (*.pdf) into the DCC as version -v2 of the document number of this completed sample record form. This DCC record should also be associated with the event "FTIR Testing". If approved, the VRT member also indicates electronic approval on the -v2 DCC record. The VRT member also informs the submitter via email whether the FTIR sampled load is approved or rejected.

SAMPLE 2 (REPEAT OF SAMPLE 1)



LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

ADVANCED LIGO FTIR SAMPLE RECORD

Document:	LIGO-E	1900306	-v1	Date:	24th SEPT 2019			
Submitter:	Name:	CALUM TORRLE		Email address:	CIT@CALTECH.EDU	Location:	CIT.	
Title:	FTIR: NOZZLE BAFFLES (BLACK NICKEL COATED STAINLESS STEEL)							
System(s):	SLIC							
Assembly(ies):	D1800227 (x4) SAMPLE 2. (REPEAT OF SAMPLE 1)							
Bake Load:	BAKE - 9633		<input checked="" type="checkbox"/>	Pre-Bake	<input checked="" type="checkbox"/>	Class A	<input type="checkbox"/> URGENT?	
JIRA URL:			<input type="checkbox"/>	Post Bake	<input type="checkbox"/>	Class B		
Notes:	SURFACES ONLY. (AIR BAKE (ABOG)) SAMPLE 2 USED ON ALL 4 PARTS (2 PASSES). TOTAL AREA SAMPLED 40 in² ^{in²}							

PARTS				SAMPLES			
#	Part No.	SN	Description	#	Type	Description (for holes indicate "through" or "blind")	Amount
1	D1800227	002	NOZZLE BAFFLE BLACK NICKEL COATED STL	1	Surface	4" x 2.5" AREA (2 PASSES)	Area (cm²): 10 in ²
				2	Holes		# of Holes:
2	D1800227	003	NOZZLE BAFFLE BLACK NICKEL COATED STL	3	Surface	4" x 2.5" AREA (2 PASSES)	Area (cm²): 10 in ²
				4	Holes		# of Holes:
3	D1800227	005	" "	5	Surface	4" x 2.5" AREA (2 PASSES)	Area (cm²): 10 in ²
				6	Holes		# of Holes:
4	D1800227	006	" "	7	Surface	4" x 2.5" AREA (2 PASSES)	Area (cm²): 10 in ²
				8	Holes		# of Holes:
5				9	Surface	→ SAMPLE 2 TOTAL	Area (cm²): 40 in ²
				10	Holes		# of Holes:

ADVANCED LIGO FTIR SAMPLE RECORD

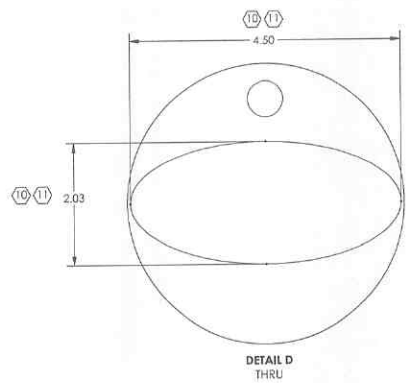
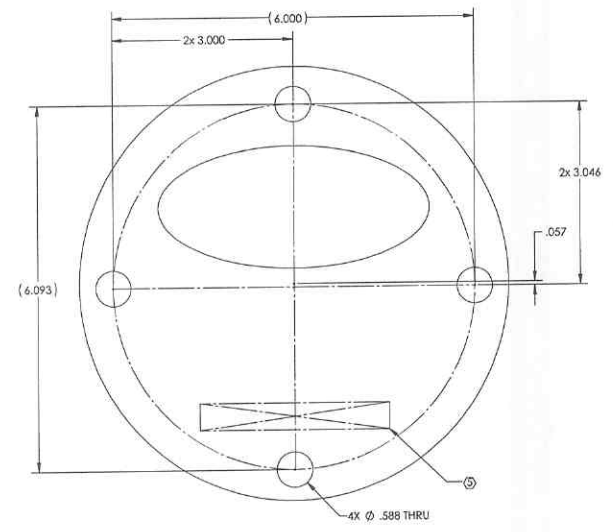
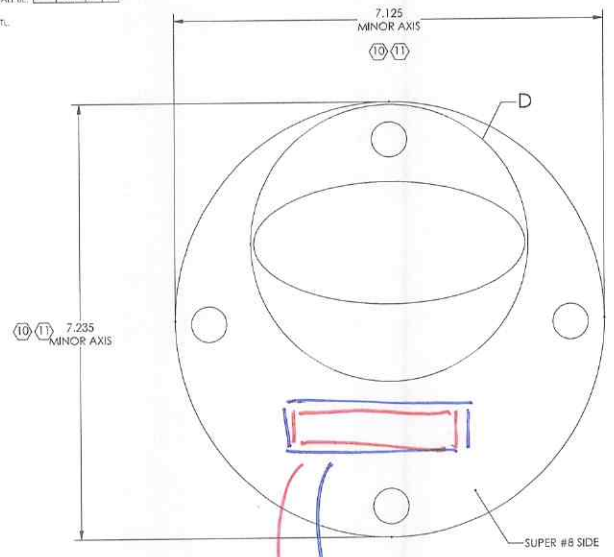
6				11	Surface	Area (cm ²):
				12	Holes	# of Holes:
7				13	Surface	Area (cm ²):
				14	Holes	# of Holes:
8				15	Surface	Area (cm ²):
				16	Holes	# of Holes:
9				17	Surface	Area (cm ²):
				18	Holes	# of Holes:
10				19	Surface	Area (cm ²):
				20	Holes	# of Holes:

Instructions:

- All parts must be sampled. The sampling must be at least 5% of the total area and at least 5% of the total number of holes. Surface samples and hole samples are to be separate. Sampling fewer than all parts in a bake load, or sampling less than 5% of the area or holes requires a waiver from the Vacuum Review Board, or a LIGO Vacuum Review Team member (see the Advanced LIGO VRB wiki for member list). *(Sampling requirements are defined in section 5.1 of E0900480.)*
- Read the instructions on how to take FTIR samples, given in document LIGO-E0900479. Make sure that the sample bottles are tightly sealed!
- Reserve a Document Number (E-type) from the LIGO Document Control Center (DCC):
<https://dcc.ligo.org/cgi-bin/private/DocDB/ReserveHome>
- Complete the form above.
- File this completed form in the DCC under the reserved number as revision 1, i.e. -v1.
- If off-site ship a printed copy of this completed form and the FTIR Samples (properly packaged) to Calum Torrie at Caltech. Follow ALL procedures laid out in LIGO-T1700469: Documentation associated with shipping "dangerous goods" in excepted quantities.
- Once at Caltech Calum will review (for need and priority) and then forward a printed copy of this completed form and the FTIR Samples (properly packaged) to:
Attn: Jerami Mennella, Jet Propulsion Laboratory
Bldg 83 room 1014800 Oak Grove drive Pasadena, California 91109-8099
- Calum will then send an email to Jerami.Mennella@jpl.nasa.gov indicating that an FTIR sample package is in route and indicate whether testing results are urgent or not.
- JPL should put the LIGO document number of this sample form into the header of their FTIR analysis report and email this report to the submitter (email given in form).
- The completed FTIR analysis report from JPL is to be reviewed and approved by the Vacuum Review Team member at the submitter's location. The Vacuum Review Team member makes any desired notations on the report and then files the report (*.pdf) into the DCC as version -v2 of the document number of this completed sample record form. This DCC record should also be associated with the event "FTIR Testing". If approved, the VRT member also indicates electronic approval on the -v2 DCC record. The VRT member also informs the submitter via email whether the FTIR sampled load is approved or rejected.

REV.	DATE	DCN #	DRAWING TREE #
v1	26 AUG 2018	E1800250-x0	-
-	-	-	-
-	-	-	-

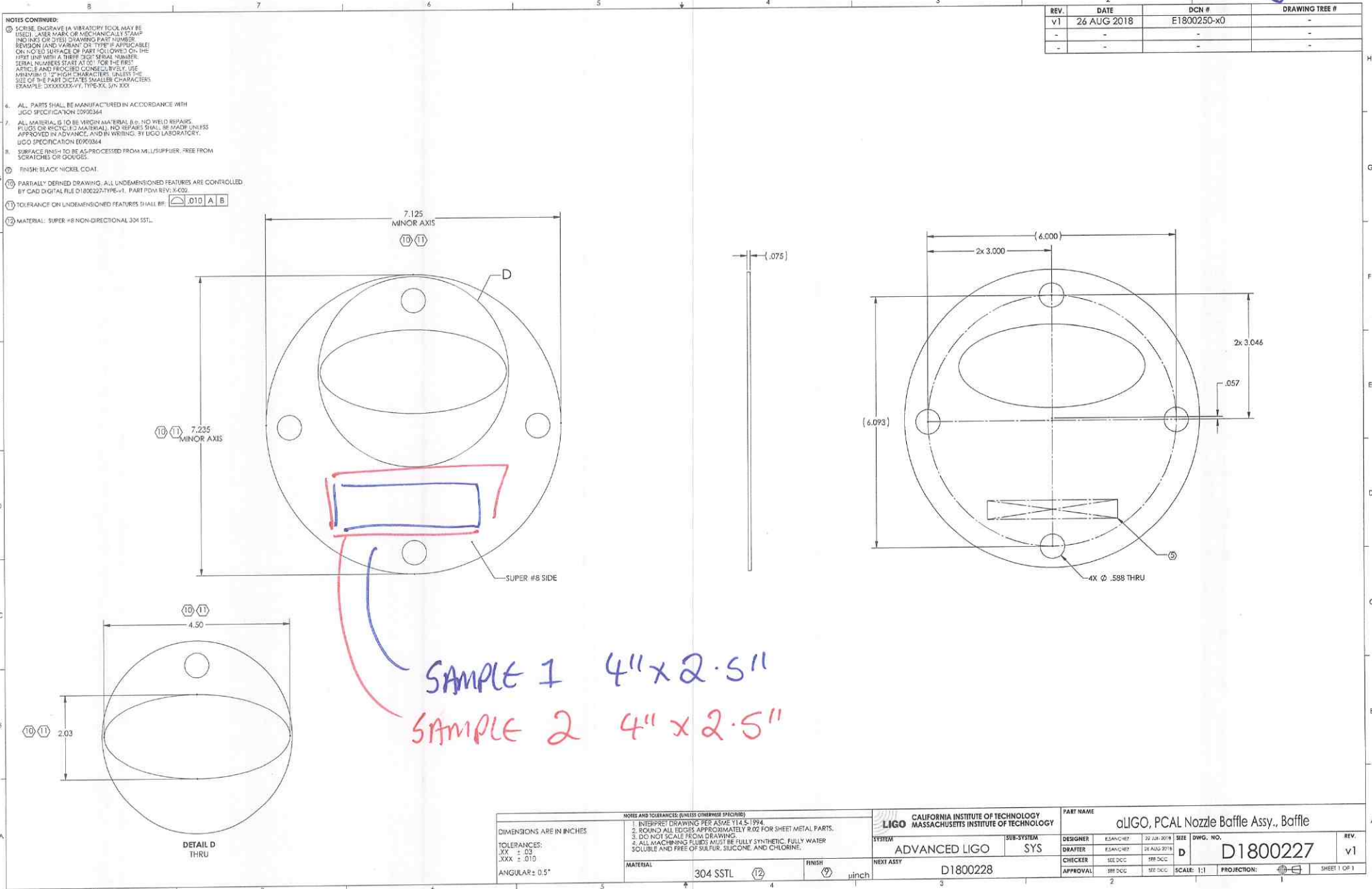
- NOTES CONTINUED:
- 10. SCRIBE ENGRAVE (A VIBRATORY TOOL MAY BE USED), LASER MARK OR MECHANICALLY STAMP INCHES OR DYES (DRAWING PART NUMBER, REVISION (AND VARIANT) OF TYPE IF APPLICABLE) ON THE SURFACE OF PART FOLLOWED ON THE LEFT SIDE WITH A THREE DIGIT SERIAL NUMBER. SERIAL NUMBERS SHALL BE: FOR THE ITEM ARTICLE AND PROCESSED COLLECTIVELY, USE WRITING 1/2" HIGH CHARACTERS. UNLESS THE SIZE OF THE PART DICTATES SMALLER CHARACTERS. EXAMPLE: DXXXXXX-VY, TYPE XX, SN XXX.
 - 11. ALL PARTS SHALL BE MANUFACTURED IN ACCORDANCE WITH LIGO SPECIFICATION 1990364
 - 12. ALL MATERIAL IS TO BE VIRGIN MATERIAL, I.E. NO WELD REPAIRS, FUGO OR RECYCLED MATERIAL, NO REPAIRS SHALL BE MADE UNLESS APPROVED IN ADVANCE AND IN WRITING, BY LIGO LABORATORY. LIGO SPECIFICATION 1990364
 - 13. SURFACE FINISH TO BE AS PROCESSED FROM MILL/SUPPLIER, FREE FROM SCRATCHES OR DINGS.
 - 14. FINISH: BLACK NICKEL COAT.
 - 15. PARTIALLY DEFINED DRAWING: ALL UNDIMENSIONED FEATURES ARE CONTROLLED BY CAD DIGITAL FILE D180027-TYPE-V1, PART PDM REV: X-G02.
 - 16. TOLERANCE ON UNDIMENSIONED FEATURES SHALL BE: ± 0.10 | A | B
 - 17. MATERIAL: SUPER #8 NON-DIRECTIONAL 304 SSSL.



SAMPLE 1 4" x 2.5"
 SAMPLE 2 4" x 2.5"

NOTES AND TOLERANCES (UNLESS OTHERWISE SPECIFIED)		CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		PART NAME	
1. INTERPRET DRAWING PER ASME Y14.5-1994 2. ROUND ALL EDGES APPROXIMATELY R.02 FOR SHEET METAL PARTS. 3. DO NOT SCALE FROM DRAWING. 4. ALL MACHINING FLUIDS MUST BE FULLY SYNTHETIC, FULLY WATER SOLUBLE AND FREE OF SULFUR, SILICONE, AND CHLORINE.		LIGO		aLIGO, PCAL Nozzle Baffle Assy., Baffle	
DIMENSIONS ARE IN INCHES TOLERANCES: .XX ± .03 .XXX ± .010 ANGULAR: 0.5°		SYSTEM ADVANCED LIGO	SUB-SYSTEM SYS	DESIGNER E5AN0-07	DATE 22 JUN 2018
MATERIAL 304 SSSL	FINISH h/nch	NEXT ASSY D1800228	CHECKER SEE DCC	DATE 26 AUG 2018	SIZE D
				DWG. NO. D1800227	REV. v1
				APPROVAL SEE DCC	SCALE: 1:1 PROJECTION:
				SHEET 1 OF 1	

(SERIALNUMBER) SN 002

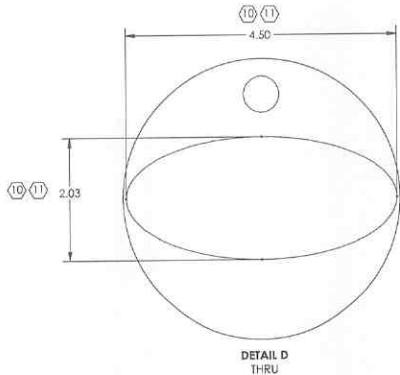
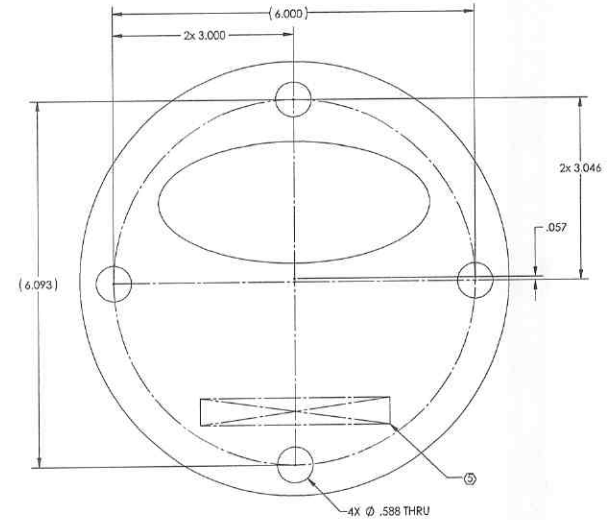
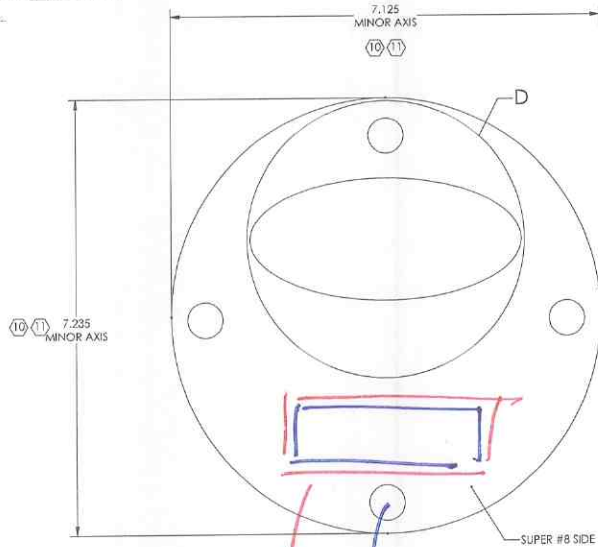


SN 003

REV.	DATE	DCN #	DRAWING TREE #
v1	26 AUG 2018	E1800250-x0	-
-	-	-	-
-	-	-	-

NOTES CONTINUED:
 2. SCORE ENGRAVE (A VENTURARY TOOL MAY BE USED), LATER MARK OR MECHANICALLY STAMP (INDICATED BY THIS DRAWING PART NUMBER, REVISION, AND VARIANT QTY TYPE IF APPLICABLE) ON HOLES SURFACE OF PART INCLUDING ON THE FIRST LINE WITH A THREE DIGIT SERIAL NUMBER. SERIAL NUMBERS START AT 01 FOR THE FIRST PARTING, AND PROCEED CONTIGUOUSLY. USE MINIMUM 1/16" HIGH CHARACTER. INDICATE THE SIZE OF THE PART, STATES, SMALLER CHARACTERS. EXAMPLE: XXXXXX-VV TYPE-XI, SA XXX

- 4. ALL PARTS SHALL BE MANUFACTURED IN ACCORDANCE WITH UGQ SPECIFICATION 5090344
- 7. ALL MATERIAL IS TO BE VIRGIN MATERIAL (I.E. NO WELD REPAIR), PELLETS OR MECHANICALLY MATERIAL, NO REPAIRS SHALL BE MADE UNLESS APPROVED IN ADVANCE, AND IN WRITING, BY UGQ LABORATORY. UGQ SPECIFICATION 5090344
- 8. SURFACE FINISH TO BE AS PROCESSED FROM MILL/SUPPLIER, FREE FROM SCRATCHES OR COOULE.
- 9. FINISH: BLACK NICKEL COAT.
- 10. PARTIALLY DEFINED DRAWING, ALL UNDIMENSIONED FEATURES ARE CONTROLLED BY CAD DIGITAL FILE D180022-TYPE-V1, PART FOM REV: X-002.
- 11. TOLERANCE ON UNDIMENSIONED FEATURES SHALL BE $\pm .010$ A B
- 12. MATERIAL: SUPER #8 NON-DIRECTIONAL 304 S31L.



SAMPLE 1 4" x 2.5"
 SAMPLE 2 4" x 2.5"

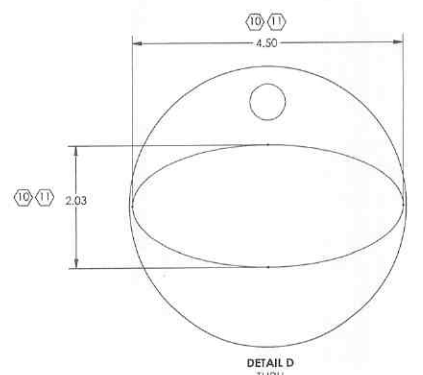
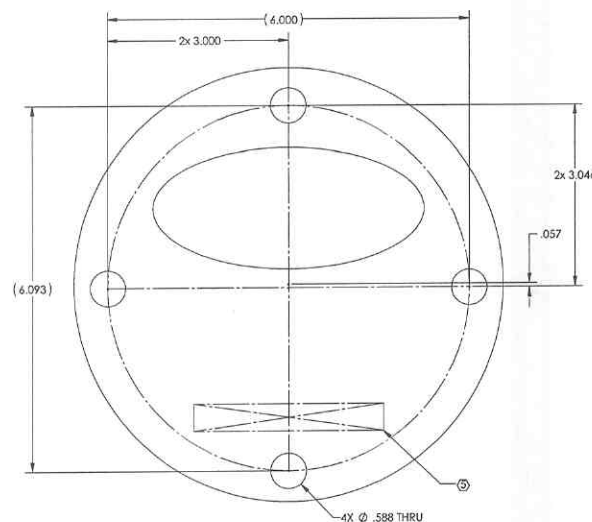
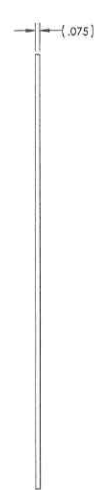
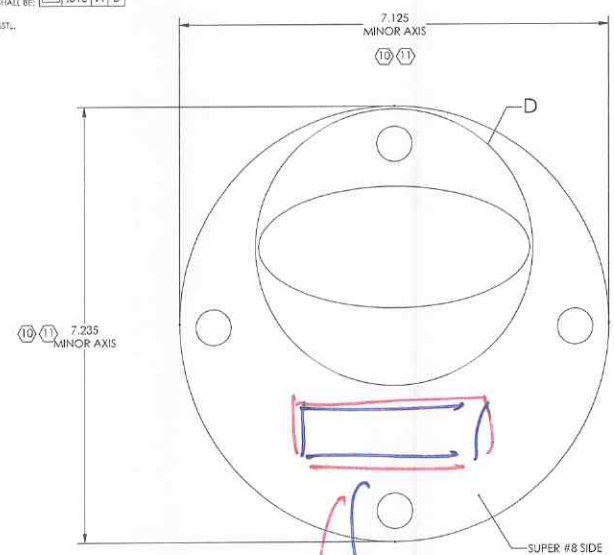
NOTES AND TOLERANCES (UNLESS OTHERWISE SPECIFIED)		LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		PART NAME	
1. INTERPRET DRAWING PER ASME Y14.5-1994 2. ROUND ALL EDGES APPROXIMATELY R.02 FOR SHEET METAL PARTS. 3. DO NOT SCALE FROM DRAWING. 4. ALL MACHINING FLUIDS MUST BE FULLY SYNTHETIC, FULLY WATER SOLUBLE AND FREE OF SULFUR, SILICONE, AND CHLORINE.		SYSTEM: ADVANCED LIGO SUB-SYSTEM: SYS		DESIGNER: E5AN-HEZ DRAFTER: E5AN-HEZ CHECKER: SEE DCC APPROVAL: SEE DCC	
DIMENSIONS ARE IN INCHES. TOLERANCES: .XX ± .03 .XXX ± .010 ANGULAR ± 0.5°		MATERIAL: 304 S31L FINISH: N μ inch		PART NAME: aLIGO, PCAL Nozzle Baffle Assy., Baffle DWG. NO.: D1800227 SCALE: 1:1 SHEET 1 OF 1	
		NEXT ASSY: D1800228		REV. v1 DATE: 22 JUN 2018 SIZE: D PROJECTOR: A	

SN005

NOTES CONTINUED:

- ① SCRIBE, ENGRAVE (A VIBRATORY TOOL MAY BE USED), LATER MARK OR MECHANICALLY STAMP (INKS OR DYES) DRAWING PART NUMBER, REMISSION (AND VARIANT OR TYPE IF APPLICABLE) ON NOTES SURFACE OF PART FOLLOWED ON THE NEXT LINE WITH A THREE DIGIT SERIAL NUMBER. SERIAL NUMBERS START AT 001 FOR THE FIRST ARTICLE AND PROCEED CONSECUTIVELY. USE MINIMUM 0.125 HIGH CHARACTERS, UNLESS THE SIZE OF THE PART DICTATES SMALLER CHARACTERS. EXAMPLE: DXXXXXX-SY1, TYPEXX, SIX XXX.
- ② ALL PARTS SHALL BE MANUFACTURED IN ACCORDANCE WITH LIGO SPECIFICATION 0990364
- ③ ALL MATERIAL IS TO BE VIRGIN MATERIAL (E.G. NO WELD REPAIRS, FUDGE OR RECYCLE). IF A REPAIR, NO REPAIRS SHALL BE MADE UNLESS APPROVED IN ADVANCE, AND IN WRITING, BY LIGO LABORATORY, LIGO SPECIFICATION 0990364
- ④ SURFACE FINISH TO BE AS-PROCESSED FROM MILL/SUPPLIER. FREE FROM SCRATCHES OR GOUGES.
- ⑤ FINISH: BLACK NICKEL COAT.
- ⑥ PARTIALLY DEFINED DRAWING. ALL UNDIMENSIONED FEATURES ARE CONTROLLED BY CAD DIGITAL FILE D1800227-TYPE-v1. PART POM REV: X-002
- ⑦ TOLERANCE ON UNDIMENSIONED FEATURES SHALL BE: $\begin{matrix} \text{A} \\ \text{B} \end{matrix}$
- ⑧ MATERIAL: SUPER #8 NON-DIRECTIONAL 304 SSTL.

REV.	DATE	DCN #	DRAWING TREE #
v1	26 AUG 2018	E1800250-x0	-
-	-	-	-
-	-	-	-



SAMPLE 1 4" x 2.5"
 SAMPLE 2 4" x 2.5"

DIMENSIONS ARE IN INCHES TOLERANCES: XX ± .03 XXX ± .010 ANGULAR ± 0.5°	NOTES AND TOLERANCES: (UNLESS OTHERWISE SPECIFIED) 1. INTERPRET DRAWING PER ASME Y14.5-1994. 2. ROUND ALL EDGES APPROXIMATELY R.02 FOR SHEET METAL PARTS. 3. DO NOT SCALE FROM DRAWING. 4. ALL MACHINING FLUIDS MUST BE FULLY SYNTHETIC, FULLY WATER SOLUBLE AND FREE OF SULFUR, SILICONE, AND CHLORINE.	CALIFORNIA INSTITUTE OF TECHNOLOGY LIGO MASSACHUSETTS INSTITUTE OF TECHNOLOGY		PART NAME aLIGO, PCAL Nozzle Baffle Assy., Baffle	
	MATERIAL 304 SSTL	FINISH N/A	SYSTEM ADVANCED LIGO	SUB-SYSTEM SYS	DESIGNER E.SANGHERA
		NEXT ASSY D1800228		DRAFTER E.SANGHERA	DATE 26 JUN 2018
				CHECKER SEE DOC	SEE DOC
				APPROVAL SEE DOC	SEE DOC
				SCALE: 1:1	PROJECTION:
				DWG. NO. D1800227	REV. v1
				SHEET 1 OF 1	

SN 006